B2

20. (Amended) The device according to claim 18, wherein cations are built on A-positions of the ceramic and where cations on B-positions are replaced by other cations or combinations of cations.

B3

34. (Amended) The device according to claim 20, wherein said ceramic comprises Pb1-x-ySExCuyV''' X/2(Zr0,54-zTi0,46+z)O3 wherein $0,01 < x < 0,05$, $-0,15 < z, +0,15$, $0 < y < 0,06$, SE is a rare earth metal, V is a vacancy and a PbO surplus from 1 to maximally 5 molar-% is employed.

REMARKS

Information Disclosure Statement

In paragraph 1 of the Office Action, the Examiner requested that Applicants point out relevant portions of two non-patent literature references provided with an information disclosure statement given the length of the references. Regarding the Jaffe reference entitled "Piezoelectric Ceramics", Applicants point to pages 148-160 as having relevance to the present application. Regarding the Xu reference entitled Ferroelectric Materials and their Applications", Applicants point to pages 120-146 as having relevance to the present application. Accordingly, Applicants respectfully request that the Examiner consider the above references, with attention at least to the portions indicated.

Oath/Declaration

In paragraph 2 of the Office Action, the Examiner noted the originally filed oath or declaration was defective and required initialed and/or dated alterations thereto. In particular, two of the four inventors changed their indication of nationality and the oath or declaration was submitted without the two inventors initials to the changes. Applicants respectfully request that this requirement be held in abeyance until an indication of allowance. Additional time is needed to locate the two inventors as a first has retired and a second has left his employment. Accordingly, these efforts are still on-going.

Election/Restriction

In paragraph 3, the Examiner acknowledged Applicant's election with traverse. Applicants thank the Examiner for this acknowledgement.

Claim Rejections – 35 USC §112

In paragraphs 4 and 5, the Examiner rejected claims 19, 20 and 34 under 35 USC §112 as being indefinite. The claims have been amended above to address the indefiniteness cited by the Examiner. In particular, the term "apt" was removed from claims 19 and 20; and the term "wherein" was added to claim 34. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Claim Rejections – 35 USC §102

In paragraphs 6 and 7, the Examiner rejected claims 1 and 13 under 35 USC §102(b) in view of Harada (US Patent 5,233,260). This rejection is traversed. The instant independent claim 1 and dependent claim 13 are directed to a piezoelectric device comprising a monolithic multilayer form. In contrast, Harada is directed to a method for producing a stacked piezoelectric element wherein in a first step a plurality of sintered piezoelectric ceramic sheets are formed. Each sheet is covered with a metal film. Then the ceramic sheets are stacked and heated while pressure is applied so as to bond the sheets together (see col. 4, lines 64-69). Applicants note that simply bonding the sheets together does not result in the same device as when a set of ceramic green sheets are staked prior to a common sintering thereof – as is the case in the instant application. Common sintering of the green sheets leads to the claimed monolithic multilayer form, which further provides for the dispensing of the final bonding step required in Harada. Accordingly, the instant claimed device is not set out in Harada and reconsideration and withdrawal of this rejection is respectfully requested.

In paragraph 8, the Examiner rejected claims 1-2, 13-14, 19, 21 and 22 under 35 USC §102(e) in view of Kato *et al.* (US Patent 6,266,230). This rejection is traversed. Kato discloses a multilayer component using inexpensive metal for its inner electrodes. One such inexpensive metal is disclosed to be copper or an allow containing copper as a main component. However, copper, as a material for inner components may only be used

if the baking process of the ceramic component is performed at temperatures below 1150°C (see col. 12, lines 39-41). Kato continues in presenting an a single example of the invention (see col. 7, line 24 – col. 8, line 40). Herein, a ceramic is used for the component which is baked at a temperature between 950 and 1100°C (see col. 7, line 40 to col. 8, line 1). The electrodes comprise Ag/Pd electrodes rather than copper electrodes. The reason for this choice of material concerns the process step of removing the binder (see col. 8, lines 31-33). In fact, the binder removal process step makes it impossible for Kato to use copper. Kato sets out a binder comprising polyvenylbutyral (col. 8, line 12) to be incinerated by increasing the temperature to 600°C. Polyvenylbutyral is a material containing carbon and hydrogen as main components. Usually, when removing such material from the ceramic layers, there has to be a surrounding atmosphere containing oxygen in order to produce CO_2 from the carbon and H_2O from the hydrogen. Accordingly, the components of the binder are transferred from a rigid to gaseous state and become volatile. Although Kato is silent about the contents of the surrounding atmosphere, it can be safely assumed that it contains about 20 Vol. % oxygen for the debindering process. Returning to the choice for electrode materials, silver/palladium is more expensive than copper, making the Ag/Pd choice inconsistent with the Kato teaching of using inexpensive materials. The reason for the Ag/Pd choice is that copper would be completely oxidized when heated to 600°C in the Kato taught ambient atmosphere. Accordingly, Kato does not disclose and teaches away from a multilayer ceramic capacitor containing elementary copper as a main component. Rather, Kato is restricted to a multilayer capacitor containing oxidized copper as a main component. Accordingly, independent claim 1 has been amended above to expressly recite "elementary" copper. The remaining claims depend from claim 1 and are therefore not anticipated by Kato. As such, reconsideration and withdrawal of this rejection is respectfully requested.

Claim Rejections – 35 USC §103

In paragraphs 9 and 10, claims 1, 2, 4-13, 15-19, 21 and 23-33 were rejected under 35 USC §103 as being unpatentable over Kato in view of Tsunooka *et al.* (US Patent 4,917,810). This rejection is traversed. The remarks set out above with respect to Kato

are repeated herein. Tsunooka does not make up for the missing teachings in Kato. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

In paragraph 11, claims 1-3, 13 and 18 were rejected under 35 USC §103 as being unpatentable over Kato in view of Seo (US Patent 4,128,489). This rejection is traversed. The remarks set out above with respect to Kato are repeated herein. Seo does not make up for the missing teachings in Kato. Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

Conclusion

A full and complete response to the outstanding office action is believed to have been made. The above amendments to the claims do not contain new matter. Attached hereto is a marked-up version of the changes made to the claims. The attached page is captioned **"Version with markings to show changes made"**. The Examiner is invited to contact the undersigned for any reason.

In the event that the transmittal letter is separated from this document and the Patent Office determines that an extension of time and/or other relief is required, Applicants petition for any required relief including extensions of time and authorize the Commissioner to charge the cost of such petitions and/or other fees in connection with the filing of this document to **Deposit Account No.: 501871** referencing attorney docket number P1999,0008US AF/BS. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Date: 12/20/2002

Respectfully Submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

In the Claims:

1. (Amended) A piezoelectric device comprising a monolithic multilayer form with a stack of at least two ceramic layers and an electrode layer set in between said two ceramic layers wherein said electrode layer contains elementary copper.

19. (Amended) The device according to claim 13, wherein cations are built on A-positions of the ceramic and where cations on B-positions are replaced by ~~apt~~ other cations or combinations of cations.

20. (Amended) The device according to claim 18, wherein cations are built on A-positions of the ceramic and where cations on B-positions are replaced by ~~apt~~ other cations or combinations of cations.

34. (Amended) The device according to claim 20, wherein said ceramic comprises Pb1-x-ySExCuyV''' X/2(Zr0,54-zTi0,46+z)O3 wherein $0,01 < x < 0,05$, $-0,15 < z$, $+0,15$, $0 < y < 0,06$, SE is a rare earth metal, V is a vacancy and a PbO surplus from 1 to maximally 5 molar-% is employed.